

Of the body-mass of the sponge, length and breadth from four to four and a half inches; the beard or anchoring rootlets from ten or twelve inches to upwards of two feet in length. Further details of the structure and affinities of this interesting production must be deferred for a future communication; but, before laying down my pen, I must not omit to acknowledge here how much I feel indebted to my friend Prof. Du Bocage, the eminent conservator of the Lisbon Museum, for the very kind and valuable assistance he rendered us in his anxiety that our expedition should not prove a fruitless one, by placing at our disposal so much of his valuable time, and by putting us in communication with the deep-sea fishermen in the neighbourhood of Setubal, through whose instrumentality *Hyalonema*, *Pheronema*, and many other of Ocean's loveliest productions were first demonstrated to be denizens of the Portuguese coasts.

BIBLIOGRAPHICAL NOTICE.

The Ornithosauria: an Elementary Study of the Bones of Pterodactyles, made from Fossil Remains found in the Cambridge Upper Greensand, and arranged in the Woodwardian Museum of the University of Cambridge. By H. G. SEELEY, of St. John's College, Cambridge. With 12 Plates. 8vo, pp. 135. Cambridge and London, 1870.

“AND when the appointed end comes they lie not dishonoured in forgetfulness” (Xenophon) is the motto chosen for this work. It is more than probable that the motto is applicable to the contents of the book; it is decidedly true of great quantities of fossils, collected as curiosities, or even as objects of scientific research. Often they are laid aside, and, for want of appreciation, or of a full recognition of the group of living things to which they are naturally allied, they wait for explanation until they fall into the hands of those who know their scientific worth, or of those to whom the progress of biology opens up the previously unknown, giving them new clues to the exploration of the obscure and labyrinthic paths of nature in the past. As with antiquities that come to the hands of the uncultured, or that may have been collected in past times, when spurious history and faint interest in foregone peoples were inimical to research, so with fossils; they mean nothing to the peasant, and are mistaken by the partially educated and prejudiced many; and they may as well be left in trust of the earth for better times, or be stored in locked cabinets till knowledge brings the key. Of late years the advance of Natural History has been rapid. The structures of Reptiles and Birds have been greatly elucidated; and the remains of extinct creatures having reptilian and avian affinities have been brought out from the phosphate-diggings near Cambridge,

and other sources, in great quantities, after their long burial, to the hands of those who know more of zoology than our predecessors knew. Their knowledge, of course, is as yet imperfect, and ever will be; but its light aids much in the discrimination of differences and similarities among these long-past creatures, and between them and their living representatives.

In the book under notice, Mr. Seeley first alludes to the collection of specimens he has to describe, the condition of the bones, and the place of their exhumation in the Greensand. Prof. Owen's memoirs on some of these bones, his views on the Pterosaurs, and the author's own works and views are next mentioned. A summary (chiefly after Von Meyer) of the opinions of palæontologists on the organization of Pterodactyles follows (a bibliographic list is appended); and Mr. Seeley's conclusions as to their organization and classification are given at pp. 24-27 and pp. 94-112. The body of the work comprises description of the specimens, with explanation of the probable affinities shown by the several bones. At pp. 112-128, twenty-five species of the new genus *Ornithocheirus* are described: several of these are new; and the rest have been removed from other genera. They are founded on the premaxillary and other bones of the snout, which vary in form, but are associated with teeth prolonged anteriorly to the muzzle, and with a longitudinal ridge on the palate.

This Catalogue is a welcome instalment of the grand series that the venerable Woodwardian Professor proposes to publish, as intimated in our notice of the Index Catalogue in the 'Annals' for March of this year. It clearly indicates the leading features and special characters of the Pterodactylian remains preserved in the Woodwardian Museum; and, after judiciously bringing together the published views of those who have treated of such Pterosaurian creatures, Mr. Seeley has discussed the chief points of relationship among the congeneric groups, according to the zoological system that appears to him the best for comprehending and explaining all the characteristics of the extinct creatures which these relics represent.

Mr. Seeley finds evidence that in these extinct animals "the general plan of the most vital and important of the soft structures was similar to that of living birds," and "that with such a common plan is associated a diversity of details sufficient to demonstrate that these animals are not birds, but constitute a new group of Vertebrata of equal value with the birds—the subclass *Ornithosauria*" (p. 27). The network of affinities connecting these and the other Vertebrates has, however, been studied by others with different results. Thus Huxley regards the natural ties so strong among Birds and Reptiles, including the Pterodactyles, as to necessitate their being regarded as one great group (*Sauropsida*), comparable with that of the *Mammalia*, the dissimilarities of structure among the Sauropsids being regarded as of less importance than the modifications that characterize the Mammals; and Owen sees closer ties between the Mammals and Reptiles than Huxley appears to have noted.

The elevation of the Cambridge Pterodactyles to a position equal to that of Birds rests upon inferences not well proved. Thus the structure of their heart is not known, but is inferred from the pneumatic condition of the bones (pp. 101 &c.). Pneumaticity, however, does not characterize some birds of the strongest flight, and the Bat is without it; hence Mr. Seeley's argument that the Pterodactyles must have been hot-blooded cannot be supported by the fact that some birds are more or less pneumatic. Nevertheless we may agree with Huxley that there is a *probability* of both Pterodactyles and Dinosaurs having had hot blood; and it is well to remember that Prof. Owen considers the hollowness of the bones to be merely an adaptive character, and of no great importance in a physiological point of view.

The osseous structure will not appear to every one so distinctly avian as it does to Mr. Seeley. With reference to the sternum, the Merganser is quoted as "a close ally" of the Pterodactyle; but, judging from pl. 1. fig. 1, it may be said that the sternum has more similarity to that of the Horse, and still more to that of the Bat, which, indeed, may be said to have a more avian tendency than the figured specimen. These modificational resemblances are of little value.

Again, Mr. Seeley shuts off the Pterodactyles from Reptiles on account of the presence of the synovial notch in the sternum; but the statement "that only in birds are distinct synovial cavities provided for the coracoids" (p. 28), though connected with Owen's name, will require modification; for when the junction of coracoid and sternum exists in Reptiles, it always has a synovial joint.

There is room, then, for further research in the affinities of Pterodactyles. Mr. Seeley has done good work in arranging and characterizing the Cambridge specimens in this very acceptable *Catalogue raisonné*, which bears good evidence not only of the author's known industry and biological knowledge, but of his talent for analytical and synthetic research among these lower Vertebrates.

Mr. Seeley thus correlates his *Ornithosauria*. I. *Pterodactylæ*, comprising:—*Pterodactylus*, Cuvier; *Ornithocephalus*, Sæmmering; *Pachyrhamphus*, Fitzinger; and *Cycnorhamphus*, Seeley. II. 1. *Rhamphorhynchæ* (*Ramphorhynchus*, Von Meyer); 2. *Dimorphodontæ* (*Dimorphodon*, Owen); 3. *Ornithocheiræ* (*Ornithocheirus*, Seeley).

The numerous figures in the lithographic plates are the work of the author's own pencil, and bear witness to his conscientious labour and enthusiasm; but they are not artistically good, and some are stated to have been damaged in the printing. They will be of more use in identifying the specimens in the museum than in conveying an accurate representation of indispensable detail to the student at a distance. Nevertheless they constitute a highly valuable and necessary adjunct to this portion of Prof. Sedgwick's projected great Catalogue of the Woodwardian Museum.